レプトスピラの５Ｓリボソーム RNA(rRNA) 遺伝子転写に関する研究

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Expression and regulation of 5S ribosomal RNA (rRNA) gene for *Leptospira interrogans* and *Leptospira biflexa*

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The basic study of ribosomal RNA gene organization and gene expression for spirochetes was performed with emphasis on 5S rRNA genes in *Leptospira*. Recent studies in our laboratory and others have characterized rRNA gene organization and rRNA gene expression in some eubacteria and archaebacteria. Almost all known eubacterial rRNAs are organized as operons with 16S, 23S, and 5S rRNA genes. The basic structure of rRNA genes in bacteria is as follows: promoter–16S rRNA gene–23S rRNA gene–5S rRNA gene–terminator, and these three rRNAs are transcribed consecutively. In contrast, *Leptospira interrogans* and *Thermoplasma acidophilum* have unique organization of the rRNA genes in their genome. On these genome, the three rRNA genes were far apart, a remarkable feature in the organization of the genes. In *Thermus thermophilus*, 16S and 23S rRNA genes are separated; in *Mycoplasma gallisepticum*, *Borrelia* species and *Pirellula marina*, the 16S gene is separated from the other genes; in the other *Mycoplasma* strain, *M. hyopneumoniae* and *Thermoproteus tenax*, the 5S rRNA gene is separated from the other genes. Primer extension experiments and S1 nuclease protection experiments in *Leptospira interrogans* revealed that each of the rRNAs is transcribed separately, consistent with the lack of physical proximity among them in the genome. The transcription initiation sites are preceded at an interval of 20–30 base pairs by conserved −35 sequences. The 5' flanking regions of each rRNA gene of *Leptospira*

interrogans was excised, inserted into *Bam*HI-*Hin*dIII sites of pKK232-8 plasmid DNA, and introduced into *E. coli* cells. The promoter sequences for 16S and 23S rRNA genes (but not for upstream sequence of 5S rRNA gene) were recognized in *E. coli*, and the chloramphenicol acetyltransferase gene was expressed. It is of interest to elucidate the organization and expression of rRNA genes in bacteria from the evolutionary and taxonomic viewpoints.

レプトスピラ属細菌の５Ｓリボソーム RNA遺伝子の転写に関するこれまでの研究成果について解説した。